

REMARKS

In accordance with the foregoing, the specification and claims 1-3, 6, 9-14, 20, and 29-31 have been amended. Claims 7, 8, 32, and 33 have been cancelled, without prejudice or disclaimer.

Claims 1-33 are pending and under consideration.

CHANGES TO THE SPECIFICATION AND ABSTRACT:

The specification and abstract have been reviewed in response to this Office Action. Changes have been made to the specification only to place it in preferred and better U.S. form for issuance and to resolve the Examiner's objections raised in the Office Action. No new matter has been added as there is support for the changes in portions of the specification and drawings as originally filed.

REJECTION UNDER 35 U.S.C. § 102:

In the Office Action, at pages 3, claims 1, 6-7, 29, and 32 are rejected under 35 U.S.C. § 102 in view of U.S. Patent No. 5,991,909 to Rajski et al. ("'909 patent'"). This rejection is traversed and reconsideration is requested.

The ''909 patent' generally describes testing of integrated circuits (IC), and more particularly, to a generation of deterministic partially specified test vectors for built-in-self-test (GIST) for ICs. The ''909 patent' provides an LFSR to generate pseudo-random data vectors. See column 4, lines 7-10, and reference character 12 in FIG. 1. A boundary scan design is applied to the IC, and pluralities of scan chains are provided. See column 4, lines 18-19, and reference character 14 in FIG. 1. The ''909 patent' also provides AND gates to override the data bits shifted from one flip-flop chain 15 to another flip-flop chain 15, to allow constant zeros to be provided to all or selected positions of each of the flip-flop chains 15. See column 3, line 66, to column 4, line 3, and column 5, lines 48-65, and reference character 20 in FIG. 1.

In contrast, the pattern modifier recited in independent claims 1 and 29, modifies "a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns given from said automatic test pattern generating unit, and to input said modified pseudo random patterns to said shift registers." The structural recitations of independent claims 1 and 29 are not taught or suggested by the ''909 patent'. Rather, the AND gates described in the ''909

patent override the data bits being shifted from one flip-flop chain 15 to another flip-flop chain 15 to allow constant zeroes to be provided, and the shift register formed with the LFSR 12 and the flip-flop chains 15 is variable in length, as described in a portion pointed out by the Office Action.

Independent claim 6 recites, “modifying a portion, to which a predetermined value is required to be set in order to detect a fault, in said generated pseudo random patterns on a basis of said ATPG patterns.” Because independent claim 6 includes similar claim features as those recited in independent claims 1 and 29, although of different scope, and because the Office Action refers to similar portions of the cited references to reject independent claim 6, the arguments presented above supporting the patentability of independent claims 1 and 29 are incorporated herein to support the patentability of independent claim 6.

Accordingly, it is respectfully asserted that the recitations of independent claims 1 and 29 are not taught or suggested by the '909 patent. It is respectfully requested that independent claims 1, 6, and 29 and related dependent claims be allowed.

In the Office Action, at pages 4, claims 2, 4, and 30 are rejected under 35 U.S.C. § 102 in view of U.S. Patent No. 6,557,129 to Rajski et al. ("'129 patent"). This rejection is traversed and reconsideration is requested.

The '129 patent generally describes testing integrated circuits, and more particularly, to compacting test responses used in testing for faults in integrated circuits. The '129 patent describes scan chains serially loaded with predetermined test patterns by shifting data on scan channels from an ATE (Automatic Testing Equipment). See column 6, line 66, to column 7, line 2, and reference 82 in FIG. 9. Also, the '129 patent provides a compactor including a selection circuitry that controls which scan chains are analyzed, where the selection circuitry passes desired test responses from the scan chains onto a compactor, while masking other test responses. See column 4, lines 22-25. The selection circuitry of the '129 patent includes a control line that masks bits from scan chains on a per clock-cycle basis, and a test response has masked bits while the remaining bits (bits not masked) of the test response are compacted. See column 4, lines 43-47.

In contrast, the mask recited in independent claims 2 and 30, converts “an indeterminate value in outputs from said shift registers into a state value of “0” or “1” to mask said indeterminate value.” The structural recitations of the mask of independent claims 2 and 30 are not taught or suggested by the '129 patent. Rather, the selection circuit in the '129 patent controls which scan chains are analyzed. The selection circuit passes desired test responses

from scan chains onto the compactor while masking other test responses, as described in a portion pointed out by the Office Action.

The mask recited in independent claims 2 and 30 does not mask a test response itself, but converts an indeterminate value included in the test response (output of the shift register) to "0" or "1," which is a determinate value, to mask the indeterminate value, thereby certainly preventing the indeterminate value from ruining a result of compaction. The '129 patent does not provide for such recitations.

Accordingly, it is respectfully asserted that the recitations of independent claims 2 and 30 are not taught or suggested by the '129 patent. It is respectfully requested that independent claims 2 and 30 and related dependent claims be allowed.

REJECTION UNDER 35 U.S.C. § 103:

In the Office Action, at page 6, claims 3, 5, and 31 are rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,991,909 to Rajski et al. ("'909 patent") and U.S. Patent No. 6,557,129 to Rajski et al. ("'129 patent"). The rejection is traversed and reconsideration is requested.

As previously set forth, the '909 patent is silent as to teaching or suggesting, "a pattern modifier to modify a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and inputting said modified pseudo random patterns to said shift registers," as recited in independent claims 3 and 31 (also recited in independent claims 1 and 29 as previously argued). Rather, the AND gates described in the '909 patent override the data bits being shifted from one flip-flop chain 15 to another flip-flop chain 15 to allow constant zeroes to be provided, and the shift register formed with the LFSR 12 and the flip-flop chains 15 is variable in length.

Nowhere in the '909 patent a teaching or suggestion of the recitations of the mask recited in independent claims 3 and 31.

Further, as previously set forth, the '129 patent fails to teach or suggest, "a mask to convert an indeterminate value in outputs from said shift registers into a state value of "0" or "1" to mask said indeterminate value," as recited in independent claims 3 and 31 (also recited in independent claims 2 and 30 as previously argued). Rather, the selection circuit in the '129 patent controls which scan chains are analyzed. The selection circuit passes desired test

responses from scan chains onto the compactor while masking other test responses.

Nowhere in the '129 patent a teaching or suggestion of the recitations of the pattern modifier recited in independent claims 3 and 31.

Thus, even assuming *arguendo*, that the '909 patent and the '129 patent were combined, a combination thereof would fail to teach or suggest the structural recitations of the pattern modifier and the mask recited in independent claims 3 and 31.

Accordingly, it is respectfully asserted that the recitations of independent claims 2 and 30 are not taught or suggested by the combination of the '909 patent and the '129 patent. It is respectfully requested that independent claims 3 and 31 and related dependent claims be allowed.

In the Office Action, at page 7, claims 9, 11, 13, 15, and 17 are rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,991,909 to Rajski et al. ("909 patent") and U.S. Patent No. 6,708,305 to Farnsworth et al. ("305 patent"). The rejection is traversed and reconsideration is requested.

The arguments presented above are incorporated herein to support the patentability of claim 9/1, 11/1, 13/1, 15/1, and 17/1 over the '909 patent.

Basically, the '305 patent selects the appropriate pseudorandom pattern for use with a scan cycle that needs care bits. See column 3, lines 32-67. In particular, the '305 patent determines care bits for a particular scan cycle. A pseudorandom pattern is generated that is then aligned with the particular scan cycle. If the pseudorandom pattern contains the care bits, with the correct values and in the proper positions within the pattern, this alignment properly tests one or more logic devices.

For instance, pseudorandom patterns in the '305 patent may be skipped until the pseudorandom pattern is found that has the correct care bits for the current scan cycle. Alternatively, care bits for a future scan cycle may determined and if a current or intermediate pseudorandom pattern contains the correct care bits for the future scan cycle, the current pseudorandom pattern may be output until and through the future scan cycle. Additionally, care bits for a future scan cycle may determined and a pseudorandom pattern generator (PRPG) perturbed to force the pseudorandom pattern, at the future scan cycle, to contain the appropriate care bits in the appropriate positions. Also, the care bit requirements of multiple scan cycles in the future can be evaluated in determining how a PRPG can be perturbed.

However, by skipping the pseudorandom patterns until the right pattern is found does not teach or suggest, “a pattern modifier **to modify** a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and to input said modified pseudo random patterns to said shift registers,” emphasis added, as recited in independent claim 1. Nothing in the ‘305 patent teaches or suggests modifying a portion in said pseudo random patterns, rather, a skipping method is provided to find the pattern with the correct care bits.

Thus, even assuming *arguendo* that the ‘909 patent and the ‘305 patent were combined, a combination thereof would be silent as to teaching or suggesting, “a pattern modifier to modify a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and to input said modified pseudo random patterns to said shift registers,” as recited in independent claim 1. A combination of the cited patents would fail to provide all the recitations of independent claim 1.

Accordingly, it is respectfully asserted that the recitations of independent claim 1 is not taught or suggested by the combination of the ‘909 patent and the ‘305 patent. It is respectfully requested that independent claim 1 and related dependent claims be allowed.

In the Office Action, at page 9, claims 8, 20,22, 24, 26, and 33 are rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,991,909 to Rajski et al. (“‘909 patent”), U.S. Patent No. 6,557,129 to Rajski et al. (“‘129 patent”), U.S. Patent No. 6,327,687 to Rajski et al. (“‘687 patent”). The rejection is traversed and reconsideration is requested.

The arguments presented above are incorporated herein to support the patentability of claim 20/3, 22/3, 24/3, 26/3, and 33/31 over the ‘909 patent and the ‘129 patent.

The ‘687 patent generally provides for a method for an incremental mode of compression. See FIG. 11 and column 14, lines 30-67. A fault is selected and a test cube is generated to test the selected fault. The test cube is used to generate a set of equations as previously described. A determination is made whether the equations are solvable. If the equations are solvable, the set of equations is incrementally appended with one or more new equations that test one or more other faults. Then, a determination is made whether the set of appended equations is solvable as shown by arrow 98.

However, similarly to the ‘909 patent and the ‘129 patent, the ‘687 patent is devoid of any

teaching or suggestion of the recitations of the pattern modifier and the mask recited in independent claims 3 and 31. Nothing in either of the references teach or suggest “a pattern modifier to modify a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and to input said modified pseudo random patterns to said shift registers,” and “a mask to convert an indeterminate value in outputs from said shift registers into a state value of “0” or “1” to mask said indeterminate value,” as recited in independent claims 3 and 31.

A combination of the cited patents would fail to provide all the recitations of independent claims 3 and 31.

Accordingly, it is respectfully asserted that the recitations of independent claim 1 is not taught or suggested by the combination of the '909 patent, '129 patent, and the '687 patent. It is respectfully requested that independent claims 3 and 31 and related dependent claims be allowed.

In the Office Action, at page 12, claims 19, 21, 23, 25, and 27 are rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,991,909 to Rajski et al. (“'909 patent”) and U.S. Patent No. 6,327,687 to Rajski et al. (“'687 patent”). The rejection is traversed and reconsideration is requested.

The arguments presented above are incorporated herein to support the patentability of claim 19/1, 21/1, 23/1, 25/1, and 27/1 over the '909 patent and the '687 patent.

As set forth above, a combination of the '909 patent and the '687 patent would fail to provide all the recitations of independent claim 1. For instance, the combination of the cited references would not teach or suggest, “a pattern modifier to modify a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and to input said modified pseudo random patterns to said shift registers,” as recited in independent claim 1.

Accordingly, it is respectfully asserted that the recitations of independent claim 1 is not taught or suggested by the combination of the '909 patent and the '687 patent. It is respectfully requested that independent claim 1 and related dependent claims be allowed.

In the Office Action, at page 14, claims 10, 12, 14, 16, and 18 are rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,991,909 to Rajski et al. (“'909 patent”), U.S. Patent

No. 6,557,129 to Rajski et al. ("129 patent"), U.S. Patent No. 6,327,687 to Rajski et al. ("687 patent"), and U.S. Patent No. 6,708,305 to Farnsworth et al. ("305 patent"). The rejection is traversed and reconsideration is requested.

The arguments presented above are incorporated herein to support the patentability of claim 10/3, 12/3, 14/3, 16/3, and 18/3 over the '909 patent', '129 patent', and the '687 patent'.

As previously argued, by skipping the pseudorandom patterns as taught in the '687 patent' until the right pattern is found, that alone does not teach or suggest, "a pattern modifier to **modify** a portion, to which a predetermined value is required to be set in order to detect a fault, in said pseudo random patterns generated by said pattern generator, on a basis of said ATPG patterns, and to input said modified pseudo random patterns to said shift registers," emphasis added, as recited in independent claim 3. Nothing in the '305 patent' teaches or suggests modifying a portion in said pseudo random patterns, rather, a skipping method is provided to find the pattern with the correct care bits.

Thus, a combination of '909 patent', '129 patent', the '687 patent', and the '305 patent' would fail to provide all the recitations of independent claim 3. For instance, the combination of the cited references would not teach or suggest the recitations of the pattern modifier and the mask recited in independent claim 3.

Accordingly, it is respectfully asserted that the recitations of independent claim 3 is not taught or suggested by the combination of '909 patent', '129 patent', the '687 patent', and the '305 patent'. It is respectfully requested that independent claim 3 and related dependent claims be allowed.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the prior art. There being no further outstanding objections or rejections, the application is submitted as being in condition for allowance, which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner's contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

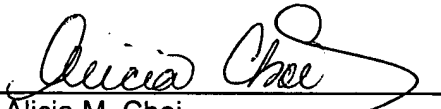
Serial No. 10/000,089

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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